

Smart Energy-Smart Growth

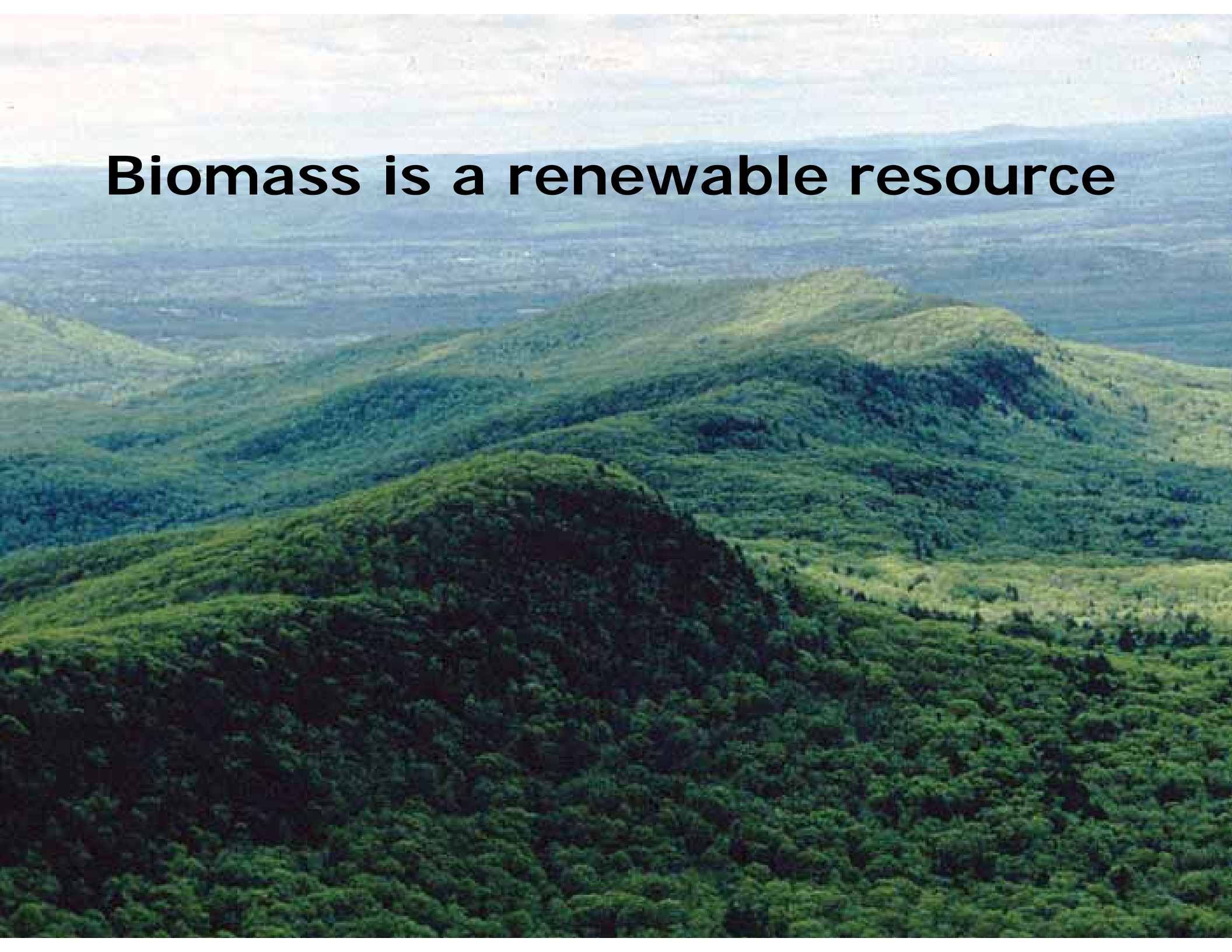
December 12, 2008

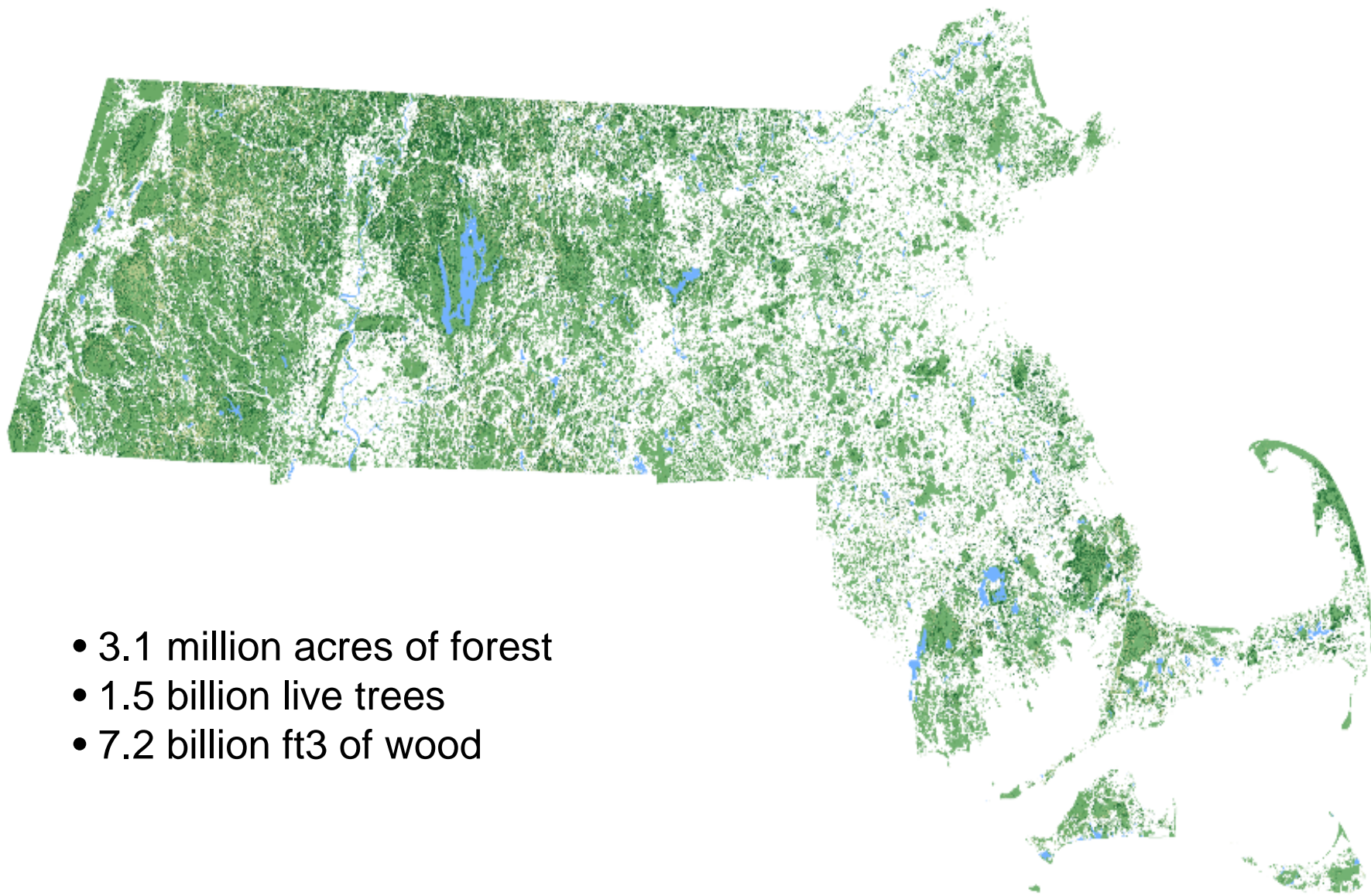
Gordon Boyce

Marketing and Utilization Forester

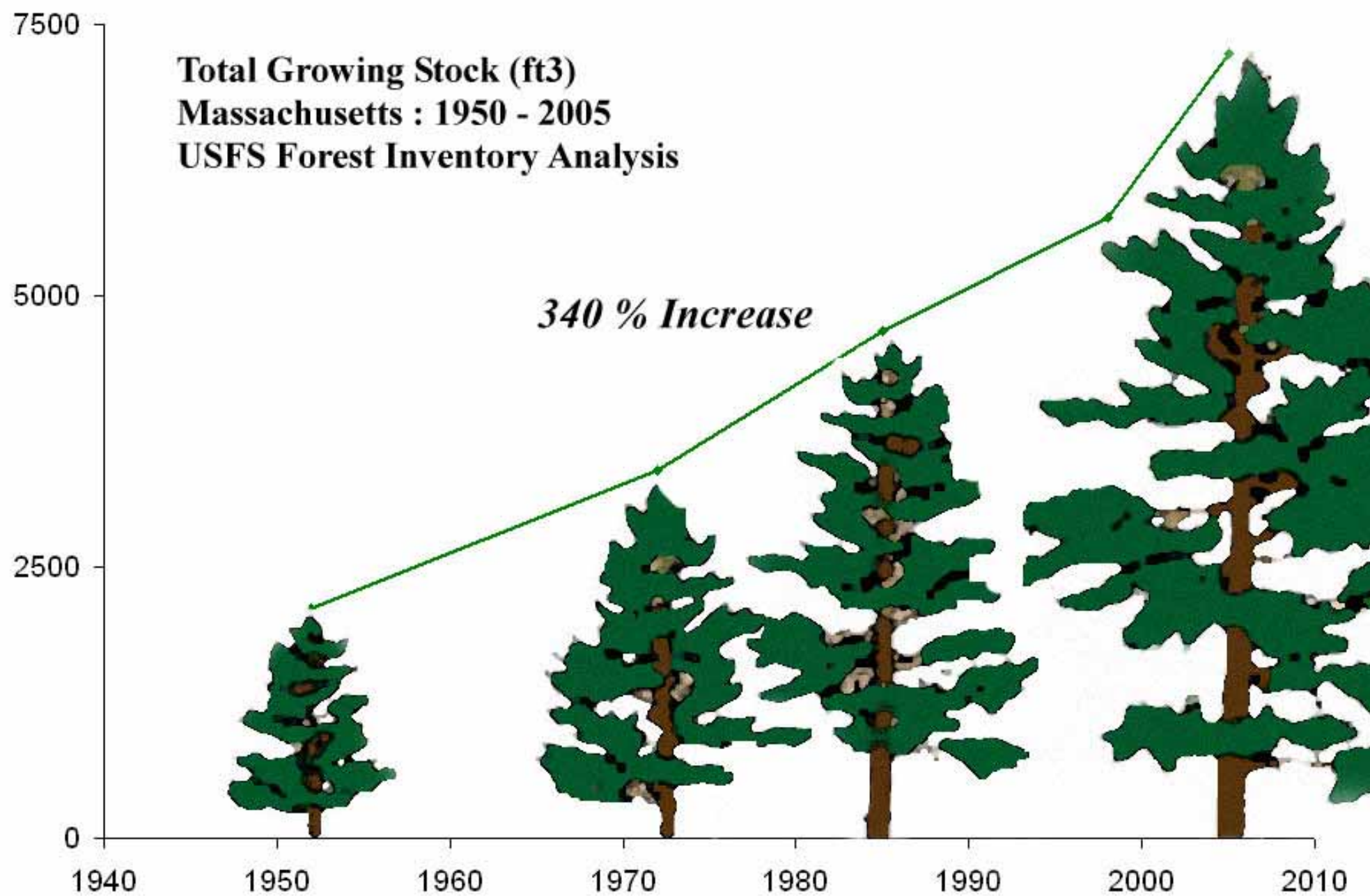
MA Department of Conservation and Recreation

Biomass is a renewable resource

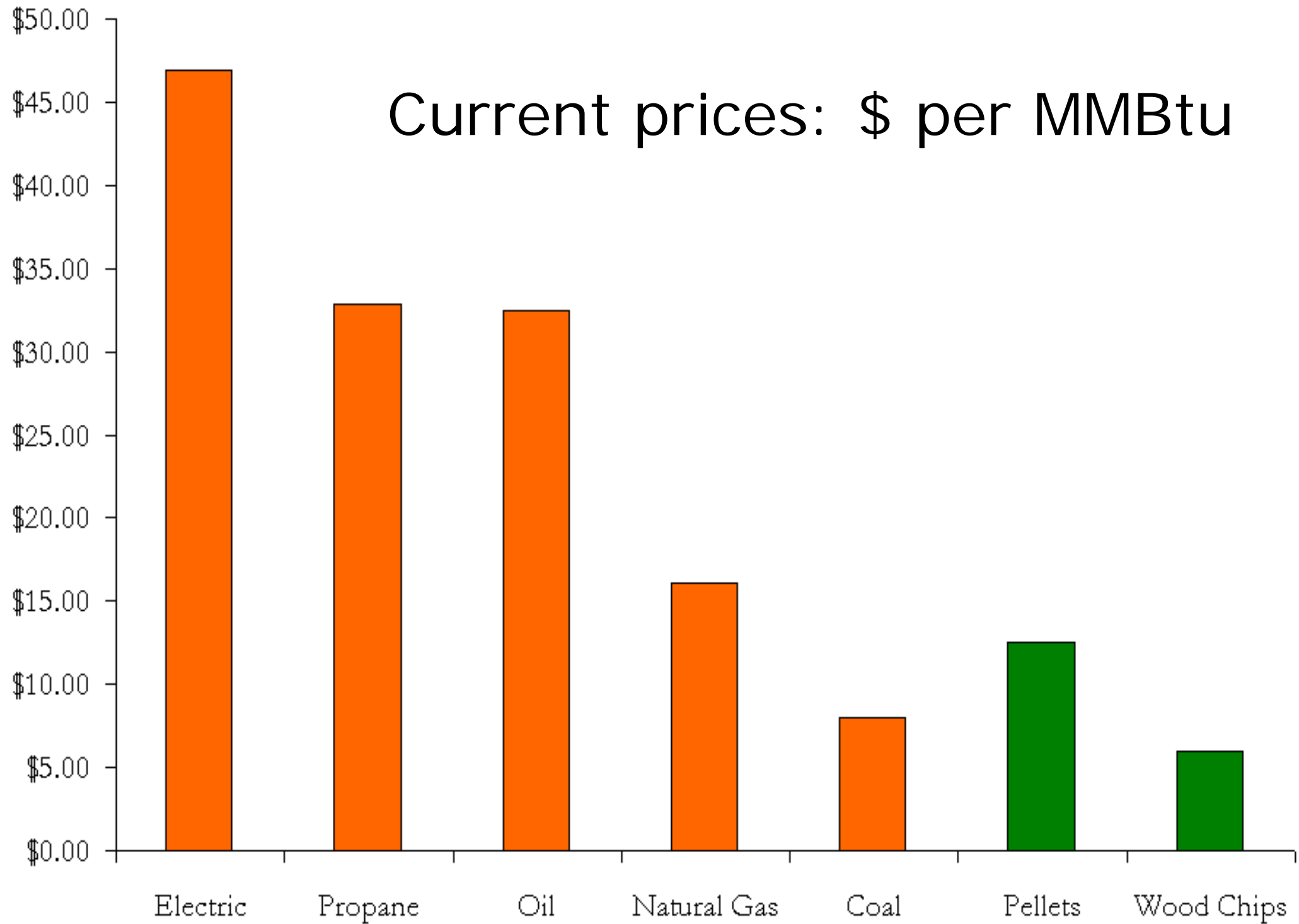




- 3.1 million acres of forest
- 1.5 billion live trees
- 7.2 billion ft³ of wood



Current prices: \$ per MMBtu



Many ways to use biomass...

- Heating
- Electricity
 - Large Plants
 - Cofiring with Coal
- Combined Heat & Power (CHP)
- Gasification
- Cellulosic biofuels

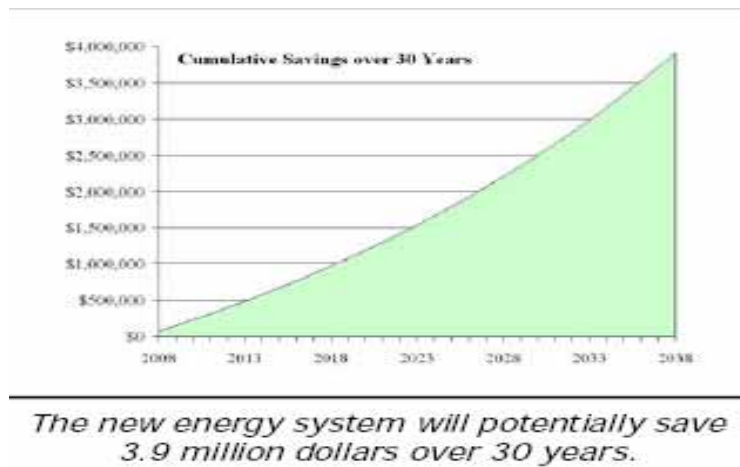


Heating

- Many sizes
 - Small (Greenhouses, Schools, Industry, Municipal Buildings)
 - 1-2 MMBtu
- Stoker boilers and furnaces
- Pellet boilers
- Very efficient use of the resource and is direct replacement of fossil fuels.



Quabbin Administration Building



This Hurst / Messersmith boiler will burn about 350 tons of wood per year.

Medium (Schools)

3-10 MMBtu



Mount Wachusett Community
College, Gardner,
Massachusetts
System Size: 8 MMBtu
Manufacturer: Messersmith
Manufacturing

The separate boiler house shown on the left heats the main college building and a fitness center with pool. The system uses advanced emissions control equipment to meet stringent air quality standards. The tall stacks help reduce on-site air impacts to a negligible level.



Mount Wachusett Community College, Gardner, MA

- 8 MMBTU heating unit
- Estimated annual cost savings of \$300,000 from previous electric heat.
- A small demonstration combined heat and power gasification system.



Large (Factories, Hospitals, College) 10-100 MMBtu



Cooley Dickinson Hospital Northampton, MA

- Over 20 years of successful operation
- Savings of \$1000 to \$1500 every day.
- Recently added a second commercial Combined Heat and Power system to generate both heat and 80 kilowatts of electricity.



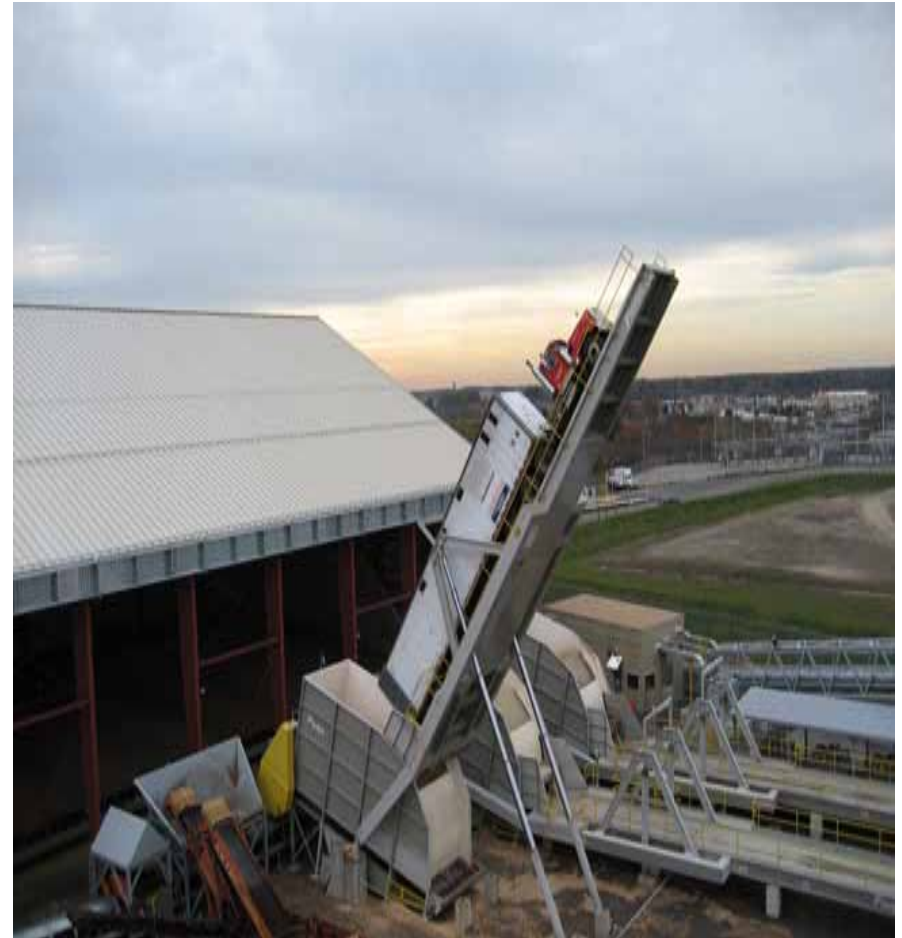
District Heating

- Many European and some American cities use super-insulated underground pipes to distribute heat from a central energy plant.



Electricity / CHP

- Generally requires a system larger than 15 MMBtu, which produces high pressure steam.
- Large power plants 10 – 50 MW, or smaller industrial size systems.



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